

Application No.: 10/068,276

Docket No.: JCLA8191

REMARKS**I. Present Status of the Application**

The Office Action rejected pending claims 1-13. Specifically, the Office Action rejected claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. (US 6,084,297) in view of Scheller (US 5,866,949). The Office Action also rejected claims 11-13 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. and Scheller as applied to claims 1 and 8 and further in view of Dordi (US 5,835,355).

After entry of the above amendments, claims 29-41 have been newly added, with claim 29 being an independent claim, to further define the scope of the invention. Claims 1-13 and 29-41 are pending in the present application with claims 1 and 29 being the independent claims. Applicants believe that these changes do not introduce new matter and reconsideration of those claims is respectfully requested.

II. Discussion of objections and rejections**A. Rejections under 35 U.S.C. § 103(a) over Brooks et al. in view of Schueller**

The Office Action, at pages 3-7, item 7, rejected claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. in view of Schueller. Applicants respectfully traverse the rejection.

Application No.: 10/068,276

Docket N .: JCLA8191

In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. M.P.E.P. § 2141.

Regarding claim 1, Examiner asserts that Brooks et al. disclose a tape ball grid array package having substantially the entire claimed structure of the tape ball grid array as in claim 1 except the blind holes having an open end for inserting the solder balls and that Schueller teaches a flexible ball grid array package having via holes and solder balls where the via hole has an open end such that the solder balls are inserted into the blind holes at the open end to provide the desired ground connection. Examiner further asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the blind holes as taught by Schueller to improve Brooks et al.'s package. Applicants respectfully disagree with Examiner's assertion.

Claim 1 of Applicants' invention is to provide a tape ball grid array package. The tape has a dielectric layer having *a patterned metallic layer and a patterned solder mask layer on both sides*. Blind holes are formed passing through the second *patterned* metallic layer and the dielectric layer of the tape and stopping at the first *patterned* metallic layer. Solder balls are planted into the blind holes with one end protruding outside a *patterned* solder mask layer over the second metallic layer. The solder balls not only protrude above the solder mask layer but also *serve as an electrical medium for connecting circuits on both sides of the tape*.

As Examiner stated, Brooks et al. fail to teach the blind holes having an open end for planting the solder balls (Office Action, page 4). Moreover, the solder balls as disclosed by

Application No.: 10/068,276

Docket No.: JCLA8191

Brooks et al. are formed on *pad-type* conductive element sites which are, in turn, electrically connected through conductive via holes through a dielectric layer (abstract; column 5, lines 33-47). Thus, Brooks et al.'s solder balls, unlike the solder balls recited in claim 1 of Applicants' invention, do not by themselves serve as an electrical medium for connecting circuits on both sides of the tape.

For at least the foregoing reasons, it is clear that Brooks et al.'s ball grid array package is significantly different from the tape ball grid array package of claim 1 of Applicants' invention. Further, as shown in the following, even if Schueller teaches a flexible ball grid array package having blind holes and solder balls where the blind hole has an open end for inserting the solder ball to provide a ground connection, one of ordinary skills in the art is not directed, suggested or motivated to provide the tape ball grid array package of the present invention as recited in claim 1.

Schueller discloses a flexible ball grid array package having a solder ball inserted into a via hole through a dielectric layer to provide a ground connection (54a in Fig. 3B). However, the dielectric layer (60 in Fig. 3B) has a metallic layer on only *one side* (59a in Fig. 3B) rather than both sides as recited in claim 1 of Applicants' invention. In addition, the ground connection solder balls disclosed by Schueller are inserted into the blind holes passing through the dielectric layer, a conductive pad and the underlying adhesive layer and stopping at a metal sheet serving as a ground plane for ground connection (60, 59b and 50 in Fig. 3B; column 9, lines 25-33) rather than, as recited in claim 1, passing through a second metallic layer, which can serve as a ground/power layer, and a dielectric layer and stopping at a patterned first metallic layer, which

Application No.: 10/068,276

Docket N .: JCLA8191

can serve as a signal transmission layer. It should be noted that the patterned first metallic layer and the patterned second metallic layer are formed respectively on an opposite side of the dielectric layer. Thus, the structures of the solder balls and blind holes disclosed in Schueller are significantly different from that recited in claim 1 of the present invention.

Furthermore, Schueller discloses solder balls inserted into the blind holes for ground connection only (54a in Fig. 3B; column 9, lines 22-33). Whereas, claim 1 of Applicants' invention is to provide both types of solder balls: those electrically connected with only the first metallic layer and those electrically connected with both the first and the second metallic layers. The foregoing two types of solder balls can serve as signal balls and as ground/power balls, respectively. Thus, in terms of the structure, the flexible ball grid array package taught by Schueller is significantly distinguishable from that recited in claim such that one of ordinary skills in the art is not suggested or motivated to combine the teaching in Schueller with the structure disclosed in Brooks et al. to create the tape ball grid array package recited in claim 1.

Claims 2-10 are claims dependent upon claim 1. Due to their dependency, claims 2-10 are also not obvious over Brooks et al. in view of Schueller since claim 1 is not obvious as discussed in the foregoing.

Therefore, as considered as a whole, claims 1-10 are not obvious over Brooks et al. either alone or in view of Schueller. Accordingly, for at least the foregoing reasons, Applicants respectfully submit that the grounds of rejection have been addressed and the rejection overcome. Reconsideration and withdrawal of the rejection are respectfully requested.

Applicati n No.: 10/068,276

Docket No.: JCLA8191

B. Rejections under 35 U.S.C. § 103(a) over Brooks et al. and Schueller as applied to claims 1 and 8, and further in view of Dordi.

The Office Action, at pages 7, item 7, rejected claims 11-13 under 35 U.S.C. § 103(a) as being unpatentable over Brooks et al. and Schueller as applied to claims 1 and 8, and further in view of Dordi. Examiner asserts that Brooks et al. and Schueller teach substantially the entire claimed structure of the package of claims 11-13 as applied to claims 1 and 8 and that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the teaching of Dordi to improve the packages in Brooks et al. and Schueller. Applicants respectfully traverse the rejection.

As discussed in the foregoing section, claim 1 and its dependent claim 8 are not obvious over Brooks et al. in view of Schueller at least for the reasons that the structures taught by Brooks et al. and Schueller are significantly different from the claimed structure of claims 1 and 8. Here, claim 11 is dependent upon claim 8 while claims 12 and 13 are dependent upon claim 11. Due to their dependency, even in view of Dordi, claims 11-13 are not obvious over Brooks et al. and Schueller as applied to claims 1 and 8.

Therefore, claims 11-13 are not obvious over Brooks et al. and Schueller as applied to claims 1 and 8, and further in view of Dordi. Accordingly, for at least the foregoing reasons, Applicants respectfully submit that the grounds of rejection have been addressed and the rejection overcome. Reconsideration and withdrawal of the rejection are respectfully requested.

Application No.: 10/068,276

Docket No.: JCLA8191

III. New Claims

Claims 29-41 have been newly added to further defined the scope of the invention. Claims 1-13 are allowable over the prior art of record for at least the reasons as presented in the foregoing sections. Thus, new claims 29-41 are allowable over the prior art of record for at least the reasons that claim 29 corresponds to the existing claim 1 in combination with the limitations of both claims 3 and 4 and two-type of solder balls and that claims 30-39 are analogous to the existing dependent claims 2, 5-13, and that claims 40-41 further define the two-type of solder balls according to the functions of the two metallic layers.

Applicants intend that these new claims 29-41 be interpreted pursuant to 37 C.F.R. § 112, ¶ 6, and intend that claims 29-41 not fall within the purview of and be interpreted in accordance with said section.

Application No.: 10/068,276

Docket No.: JCLA8191

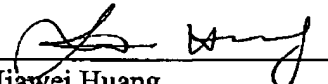
CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 11 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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